Using FlexBoot for Booting SLES11 SP3 from an iSCSI Target

User Manual

Rev 1.0

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About this Manual

This User Manual provides guidance for booting diskless PXE clients to SLES11 SP3 from remote storage over iSCSI, using Mellanox adapter card and boot agent (FlexBoot) over Ethernet Network.

The setting-up and configuration of the iSCSI target and PXE server as described within this document are merely recommendations and provided as is, and may be applied according to requirements of the environment in which the actual work takes place.

The actions described in this paper are focused on Mellanox solution.

1 Using FlexBoot for Booting SLES11 SP3 from an iSCSI Target

Below are instructions on how to provision a diskless system (the client) with a fresh SLES11 SP3 installation to a remote storage (IE: a LUN partition on an iSCSI target) and then SAN-Booting (iSCSI boot) the client using Mellanox PXE boot agent (FlexBoot). The iSCSI configuration in this document is very basic (no CHAP authentication, no multipath I/O) and demonstrates basic PXE SAN Boot capability.

In this document, IET is used as the iSCSI Target.

In the example below:

- sqa030 (a Linux host) - performs the role of the PXE server and an iSCSI target and
- sqa070 (a host) - performs the role of the PXE client and a sanity check environment
- sqa030 – The OS is configured with IP 12.7.6.30, and the DHCP IP configuration for the diskless client is 12.7.6.70
- sqa030 - has a 21.5GB disk partition on its local HDD, called /dev/cciss/c0d0p9, which will be used as the storage volume to host the client's OS. It also serves as DHCP, TFTP, and NFS server for PXE clients
- Both servers have a Mellanox ConnectX-3 based 10GE NIC equipped with PXE boot capabilities via Expansion ROM called FlexBoot (http://www.mellanox.com/page/products_dyn?&product_family=34&mtag=flexboot).

1.1 Configuring the iSCSI Target Machine

➢ ***To configure the iSCSI target:***

1. Download the IET target software from.

   http://sourceforge.net/projects/iscsitarget/files/iscsitarget/1.4.20.2/

2. Install iSCSI target and additional required software on target server.

```
[root@sqa030 tmp]# tar xzvf iscsitarget-1.4.20.2.tar.gz
[root@sqa030 tmp]# cd iscsitarget-1.4.20.2/
[root@sqa030 iscsitarget-1.4.20.2]# make && make install
```

3. Create the IQN in the ietd configuration file.

```
[root@sqa030 ~]# vi /etc/iet/ietd.conf
## Optional: for CHAP authentication, uncomment the following #lines
#IncomingUser joe secret
#OutgoingUser jack 12charsecret
Target iqn.2013-10.qalab.com:sqa030.prt9
Lun 0 Path=/dev/cciss/c0d0p9,Type=fileio,IOMode=wb
ImmediateData Yes
MaxConnections 1
InitialR2T Yes
```

The local Hard Disk partition assigned to the LUN (/dev/cciss/c0d0p9 in the example above) **must not contain any valuble data, as this data will be destroyed by the installation process taking place later in this procedure**

4. Edit the /etc/sysconfig/iscsi-target file as follow.

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```
OPTIONS="-c /etc/iet/ietd.conf --address=12.7.6.30"
```

5. Start the iSCSI target service.

```
[root@sqa030 ~]# /etc/init.d/iscsi-target start
```

6. Perform a sanity check by connecting to the iSCSI target from a remote PC on the 10GE network link.

1.2 DHCP Server Configuration

Edit a host-declaration for your PXE client in the DHCP configuration file, serving it with pxelinux.0, and restart your DHCP.

Here is an example of such host declaration inside DHCP config file:

```
host qadell011 {
     filename "pxelinux.0" ;
next-server 12.7.6.30;
     option host-name "qadell011";
     fixed-address 12.7.6.11  ;
     hardware ethernet 00:02:C9:E5:D8:E0 ;
}
```

NOTE: "pxelinux.0" is a part of the "syslinux" RPM (/usr/share/syslinux/pxelinux.0). To install the syslinux RPM on RedHat, run "yum install syslinux". On SUSE - "zypper install syslinux".
To get the latest version of syslinux please refer to http://www.syslinux.org

1.3 PXE Server Configuration

Download SLES11SP3-kISO-VPI.tgz from
http://www.mellanox.com/page/products_dyn?&product_family=34&mtag=flexboot

- An example of PXE server configuration:

```
SLES11SP3-kISO-VPI/pxelinux.cfg/default
```

- Kernel and initrd for the installation:

```
SLES11SP3-kISO-VPI/pxeboot-install/initrd
SLES11SP3-kISO-VPI/pxeboot-install/linux
```

- Kernel and initrd for the boot after the installation:

```
SLES11SP3-kISO-VPI/pxeboot/initrd
SLES11SP3-kISO-VPI/pxeboot/linux
```

- kISO installation medium that can be used to boot off from, instead of the original SLES11 installation media. During the installation process you will be asked to insert the original installation medium to continue the installation

```
SLES11SP3-kISO-VPI/sles11-sp3-x86_64-mlnx_ofed-2.1-1.0.6.iso
```

As we are using PXELINUX, the boot label for the SLES 11.3 PXE installtion should have the folowing text:

```
LABEL SLES11.3x64_manual_installl
        MENU LABEL ^1) Install SLES11.3
        kernel SLES/11.3/GM/x86_64/linux
        append initrd=SLES/11.3/GM/x86_64/initrd
install=nfs://12.7.6.30/pxerepo/SLES/11.3/x86_64/DVD1/
```

```
LABEL SLES11.3x64_iscsi_boot
        MENU LABEL ^2) SLES11.3 iSCSI boot
        kernel SLES/11.3/GM/x86_64/pxeboot/linux
        append initrd=SLES/11.3/GM/x86_64/pxeboot/initrd
netroot=iscsi:12.7.6.30::::iqn.2013-10.qalab.com:sqa030.prt9
TargetAddress=12.7.6.30 TargetName=iqn.2013-10.qalab.com:sqa030.prt9
TargetPort=3260 debug=1
net_delay=10 rootfstype=ext3 rootdev=/dev/sda2 rdshell
```

The steps described in this document do not refer to an unattended installation with autoyast. For official information on SLES unattented installation with autoyast, please refer to:

https://www.suse.com/documentation/sles11/book_autoyast/?page=/documentation/sles11/book_autoyast/data/book_autoyast.html

The folowing is known to work with Mellanox NIC:

```
append initrd=SLES-11-SP3-DVD-x86_64-GM-DVD1/boot/x86_64/loader/initrd
install=nfs://<NFS IP Address>/<path the the repository directory>/
autoyast=nfs://<NFS IP Address>/<path to autoyast xml
directory>/autoyast-unattended.xml biosdevname=0
IPAPPEND 2
```

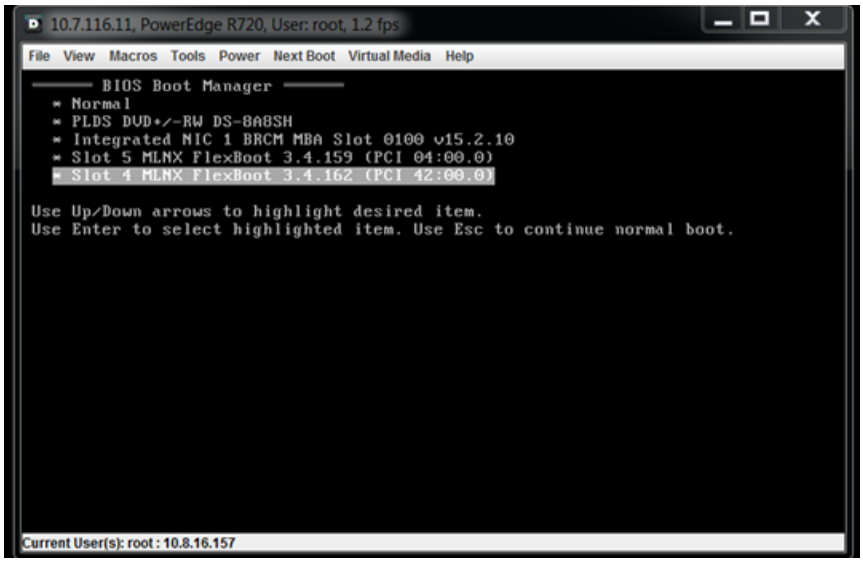
1.4 Installing SLES11 SP3 on a Remote Storage over iSCSI

1. Reboot the diskless client and perform a PXE boot with FlexBoot.

   This is not an iSCSI boot, rather a regular PXE initiated network deployment of SLES11 SP3. In the DHCP server configuration, the PXELINUX (pxelinux.0) and a SLES11 SP3 distribution media will be provided for network installation.

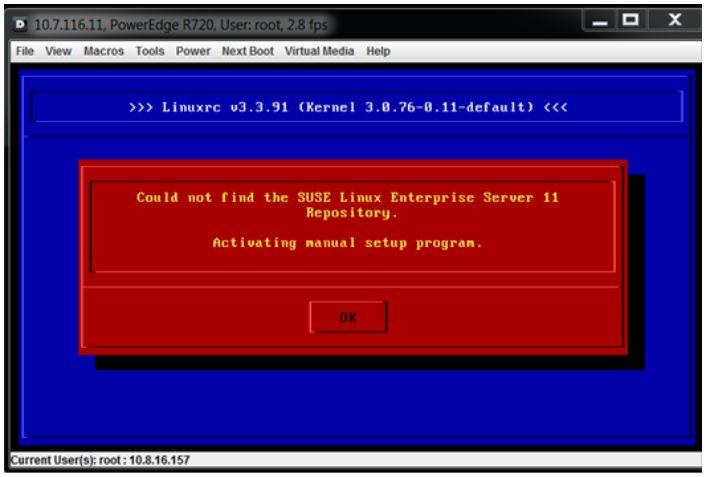
   The clients' HDD was removed beforehand; therefore the installer will ask to locate a HDD. The built-in iSCSI discovery will be used to connect to the iSCSI target LUN partition.

2. Reboot the client and invoke PXE boot with the Mellanox boot agent.

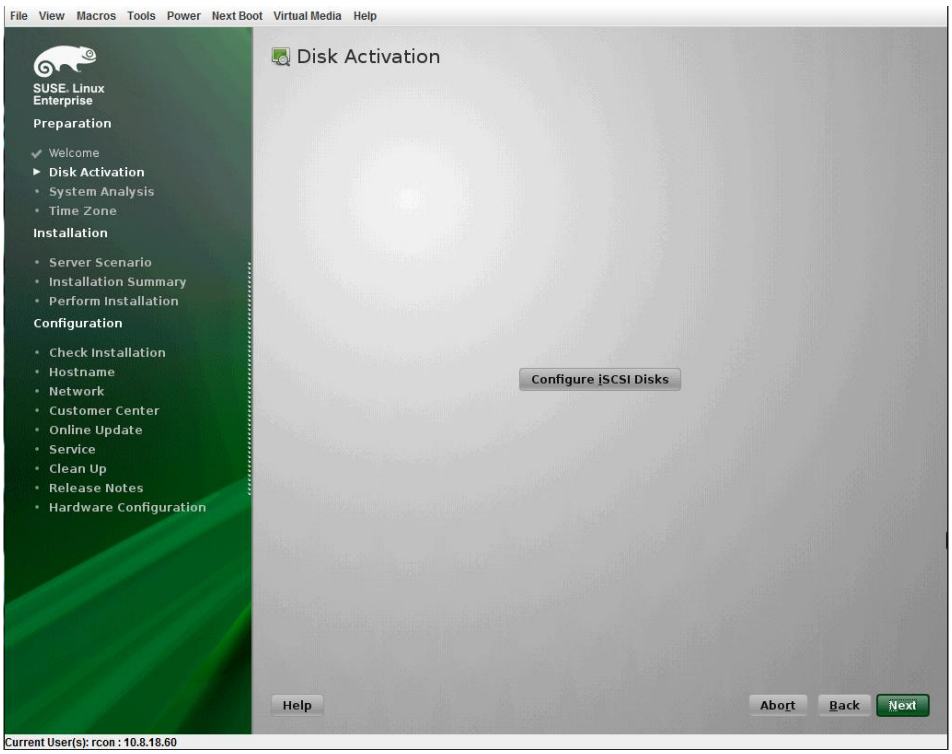

10.7.116.11, PowerEdge R720, User: root, 1.2 fps
File View Macros Tools Power Next Boot Virtual Media Help
BIOS Boot Manager
Normal
PLDS DVD+/-RW DS-8A8SH
Integrated NIC 1 BRCM MBA Slot 0100 v15.2.10
Slot 5 MLNX FlexBoot 3.4.159 (PCI 04:00.0)
Slot 4 MLNX FlexBoot 3.4.162 (PCI 42:00.0)
Use Up/Down arrows to highlight desired item.
Use Enter to select highlighted item. Use Esc to continue normal boot.
Current User(s): root : 10.8.16.157

3. Select the "`Install SLES11.3`" boot option from the menu (see pxelinux.cfg example above).

   After about 30 seconds, the SLES installer will issue the notification below due to the PXELINUX boot label we used above.


10.7.116.11, PowerEdge R720, User: root, 2.8 fps
File View Macros Tools Power Next Boot Virtual Media Help
>>> Linuxrc v3.3.91 (Kernel 3.0.76-0.11-default) <<<
Could not find the SUSE Linux Enterprise Server 11 Repository.
Activating manual setup program.
OK
Current User(s): root : 10.8.16.157

4. Click **OK**.
5. Click on the **Configure iSCSI Disks** button.



6. Choose **Connected Targets** Tab.

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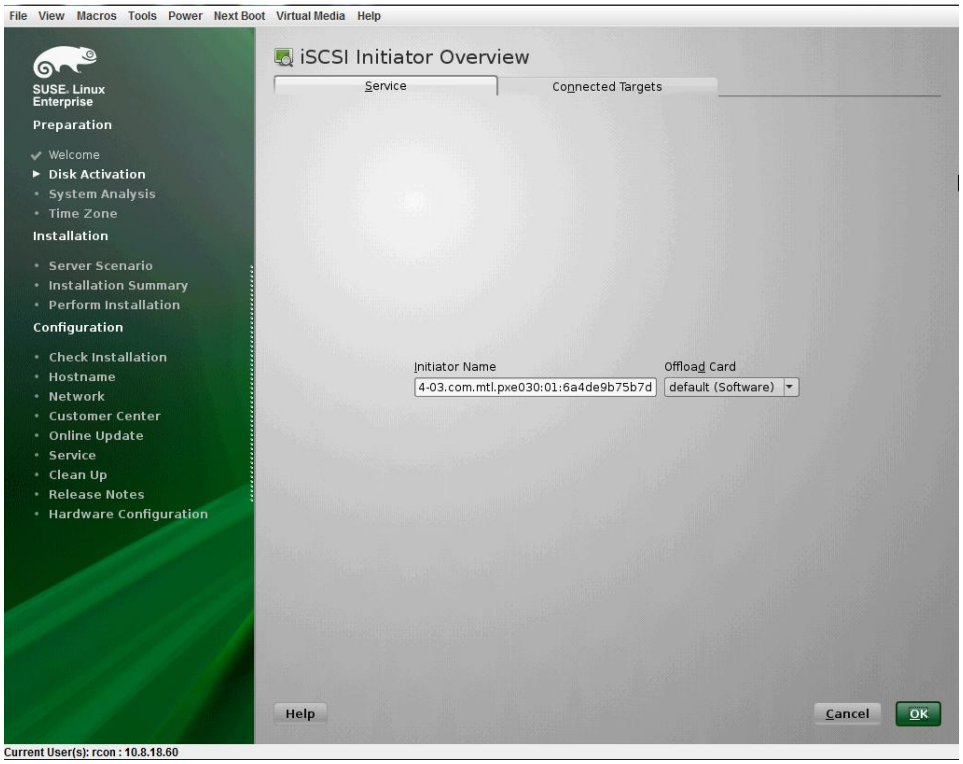
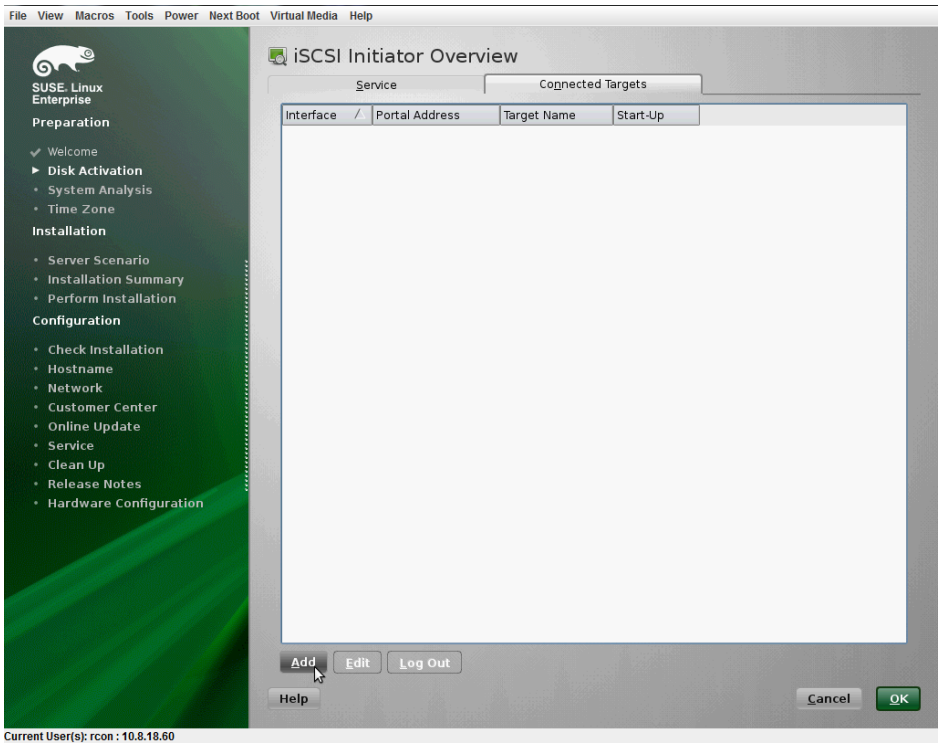


7. Click **Add**.



8. Enter the IP address of the iSCSI storage target.
9. Click **Next**.

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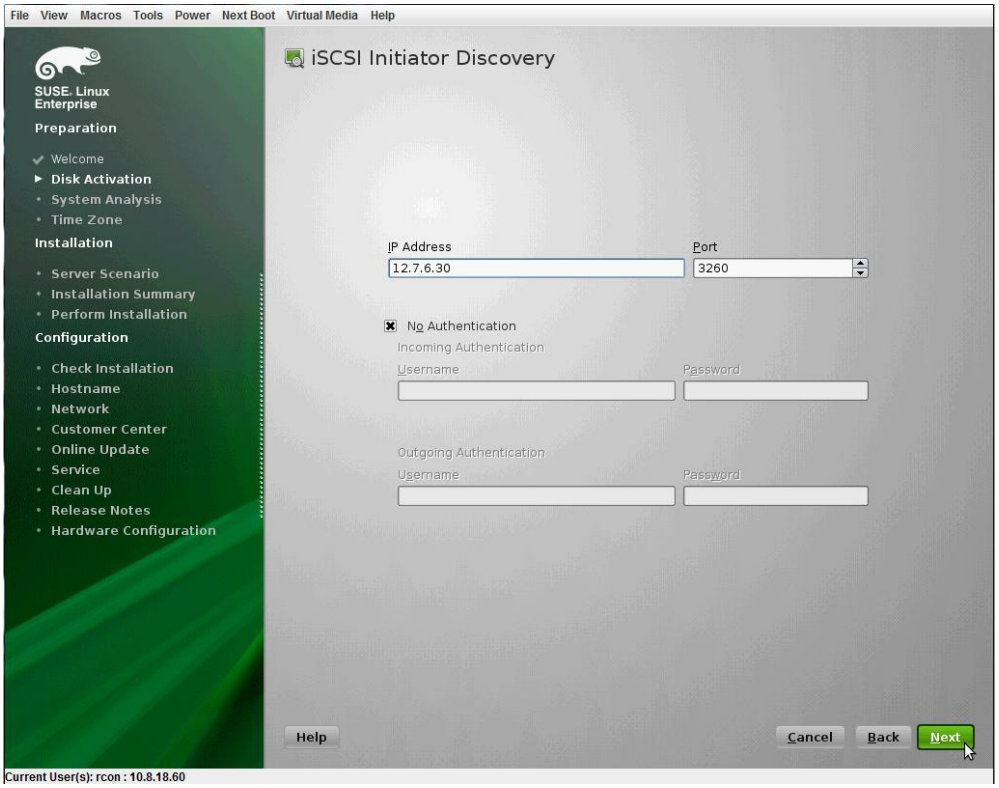
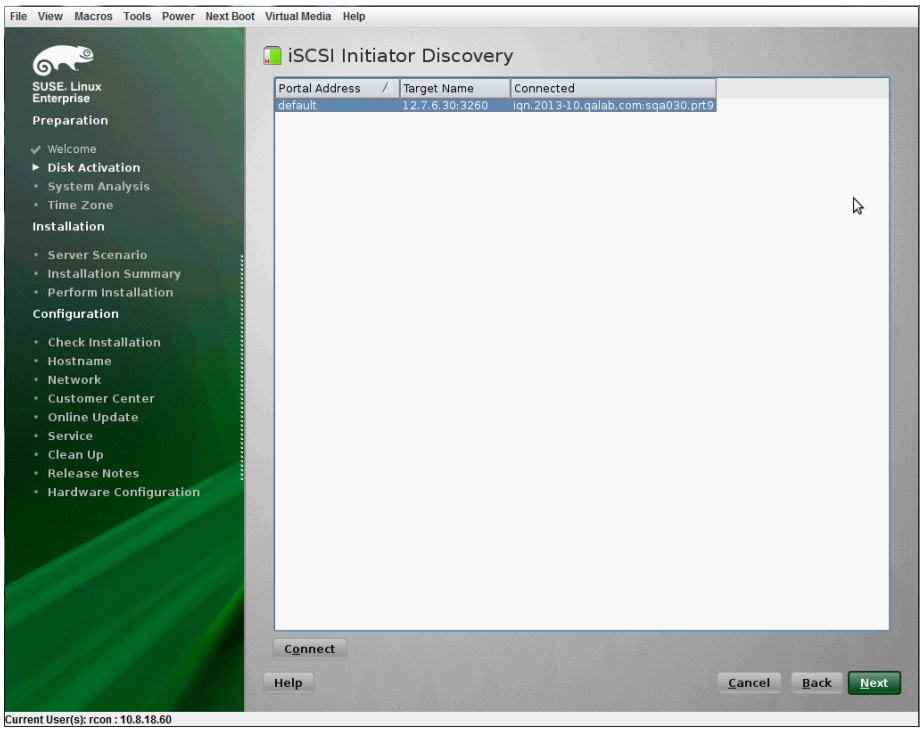


10. Select the relevant target from the table (In our example, only one target exist so only one was discovered).
11. Click **Connect**.



12. Select **onboot** from drop-list.

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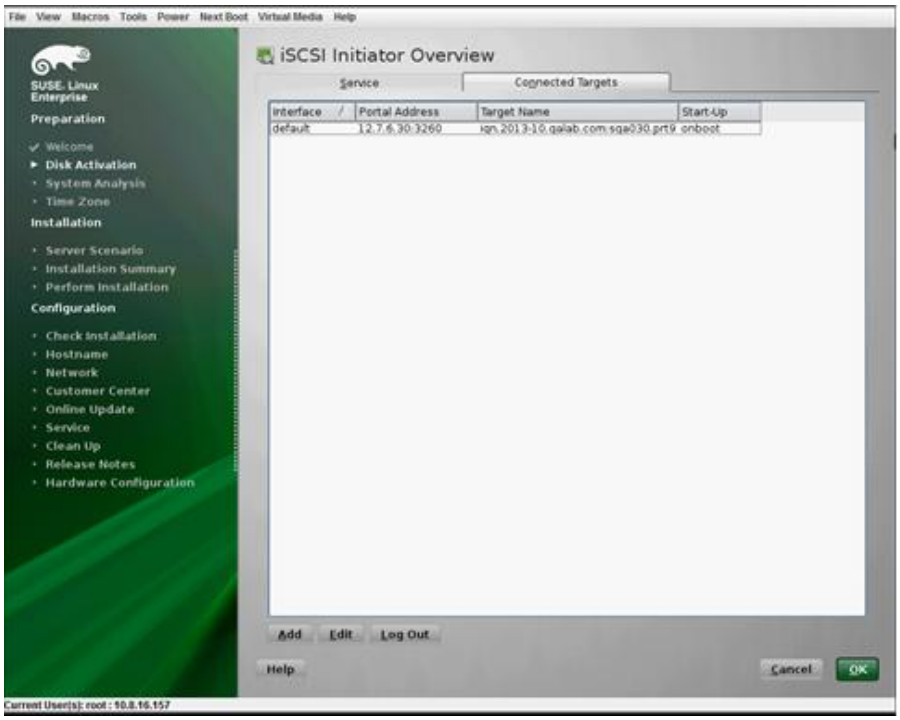
13. Click **Next** to exit the discovery screen.
14. Go to the **Connected Targets** Tab again to confirm iSCSI connection with target.



15. Click **OK**.
16. Click **Next** back at the Disk Activation screen.
17. Select **New Installation**.

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18. Click **Next**.
19. Complete **Clock and Time Zone** configuration.
20. Select **Physical Machine**.

21. Click **Next**.
22. Click **Install**.

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Make sure "`open-iscsi`" RPM is selected for the installation under "`Software`".

After the installation is completed, the system will reboot.

Make sure you choose "`SLES11.3x64_iscsi_boot`" label from the boot menu (See PXE Server Configuration chapter above).

23. Complete post installation configuration steps.

NOTE: It is recommended to download and install the latest version of MLNX_OFED_LINUX available from http://www.mellanox.com/page/products_dyn?product_family=26&mtag=linux_sw_drivers

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